

SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

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METEOROLOGY IN PORTUGAL.

Señor Capello has done us the honour of sending full particulars respecting several of the points raised in the article in our December number. We are glad to find that in nearly every respect the explanations are perfectly satisfactory. Instead of translating the whole of Señor Capello's letter, we will take the various subjects in the order in which they follow in the article above-mentioned:—

"A recording rain gauge of which we should be glad to receive a description."

This, with an engraving, will appear in *British Rainfall*, 1879.

"We do not see mention of any thermometers for observing the temperature of the earth at different depths."

Señor Capello sends us the following welcome information:—
"Since January, 1879, we have observations daily at 9 a.m. of five of Becquerel's electric thermometers at the following depths:—

Metres	·05	·3	·7	1·1	1·5
Inches	2	12	28	43	59

With the exception of a little trouble with the galvanometer on very damp days, the observations are easily made, and they can be repeated every 15 or 20 minutes if desired.

These thermometers have given the following results for 1879:—

Depth in Metres	·05	·3	·7	1·1	1·5
Maximum Temperature...	75°·2	78°·4	76°·5	74°·5	72°·5
Date	Aug. 30.	Aug. 31.	Sept. 4.	Sept. 5.	Sept. 8.
Minimum Temperature ...	44°·2	50°·5	53°·6	55°·4	56°·7
Date	Feb. 27.	Feb. 28.	Mar. 3.	Mar. 7.	Mar. 12.
Mean Temperature.....	59°·7	64°·4	64°·9	64°·9	64°·6
Range of Temperature ...	31°·0	27°·9	22°·9	19°·1	15°·8

Since the 1st of January, 1880, we are taking direct observations of five thermometers at the same depths, but on Lamont's system, as advocated in the *Meteorological Magazine* for January, 1876, but the tubes are of lead; up to the present time the results are sufficiently in agreement with those from the electrical thermometers.

Moreover, we have two of Becquerel's electrical thermometers buried 5 metres (16½ ft.) and 10 metres (33 ft.) in a bed of clay, but these are designed rather for determining the rate of penetration of heat than for agricultural purposes.

"The mean of the max. and min. at Campo Maior gives $62^{\circ}\cdot3$, but a correction varying from $0^{\circ}\cdot5$ to $1^{\circ}\cdot3$ has been applied for some reason not stated."

At Campo Maior observations are made at 9 p.m. as well as at 9 a.m., noon, and 3 p.m., and for that station the mean temperatures are deduced from

$$\frac{\text{Max.} + \text{Min.} + 9 + 9}{4}$$

which is more exact.

"There is an error of 6mm. either in the month of Dec., Jan., or Feb."

Yes. The fall for February, 51·9 mm. in the original, was misprinted 57·9. In the *Met. Mag.*, therefore, on page 171, under Campo Maior, February should be 2·04 and the total 21·78 in.

"There are now two rain gauges at the observatory—one which was erected about 20 years since, on the top of the observatory, 75 ft. above the ground, and the other 5 ft. above the ground; but they collect nearly identical amounts. This is such an unusual fact that we should be glad to know whether the lower gauge is quite fully exposed."

Señor Capello makes the following interesting remarks:—

"On the central tower of the observatory we have four rain gauges placed nearly at the cardinal points N., E., S., W.; those at the N. and S. are on Babinet's pattern, $0\cdot01^{\text{m}^2}$ ($4\cdot43$ in. diam.), for direct observation; dependent upon the direction and force of the wind, these two gauges never agree, that on the windward side always collects least: we take the mean of the two.

"The lower gauge is 5 ft. above the ground, quite open, and far from the influence of trees and buildings.

"When the wind is light or calm, all four of the upper gauges and the lower one nearly agree; but if the wind is moderate or strong, there is a great difference between the upper gauge on the windward side and the lower one. This difference is, however, much lessened by taking the mean of the two upper gauges. My own opinion is that the differences between upper and lower rain gauges is solely dependent upon the direction and force of the wind.

"The two gauges at the E. and W. of the tower are of five times the area of those of Babinet ($9\cdot92$ inches diameter), and the rainfall is recorded automatically in the room below."

REVIEW.

Comment on observe Les Nuages pour prévoir le Temps, par ANDRÉ POEY. *Troisième Edition*. Paris: Gauthier-Villars. Svo. vi.—172 pages, 3 figures, and xvii. chromo-lithographic plates.

To those who know Prof. Poëy chiefly for his labours in Meteorological Bibliography, it will undoubtedly appear rather droll for us to commence our notice of this excellent book by charging him with an offence against the rules of Bibliography. The title page states that this is the third edition of "How to observe the Clouds," whereas that title is as new as it is happy. The facts, we believe, are that

Prof. Poëy first suggested his new classification of clouds at a meeting of the Académie des Sciences at Paris in 1863 ; a fuller paper, read before the Meteorological Society of France, was translated into Spanish and published in Mexico, then developed and printed in English in two or three publications in the United States. The most important and, indeed, world-wide circulation being that of the reprint in the Report of the Smithsonian Institution for 1870 (total issue upwards of 13,000 copies), where it appeared under the title of "*New Classification of Clouds.*" Two years after it was further developed, and published in the *Annales Hydrographiques* with the same title, "*Nouvelle Classification des Nuages,*" and now it appears again with a title entirely different. Has Prof. Poëy no pity for the unfortunate bibliophile of the 21st century, who tries to find copies of the first and second editions of "*Comment on observe les Nuages*"? Apart, however, from the confusion which the new title may occasion to some very few individuals, we think that the old one gives the more accurate idea of the contents of the work.

We suppose that the number of copies printed of the *Annuaire Météorologique* of Lamarck must have been extremely small, for very few perfect sets are to be found, and it is, we suppose, to this cause that must be attributed the general ignorance of the fact that Lamarck suggested a classification of clouds a year or so before our own Howard read his paper before the Askesian Society in the winter of 1802-3. We are sure, however, that had Poëy known Howard personally, he would have given a rather different turn to the phrase at the top of page 5 of the work before us.

It would be presumptuous for us to pronounce an *ex cathedra* opinion as to the extent to which the alterations suggested by Prof. Poëy will be adopted ; in the present work he gives the opinions formed after many years of study in various regions of the globe, and he is doubtless quite ready to follow up the proposals which he has submitted. It is quite impossible for us to discuss every point raised in this interesting work, and it will be far better for our readers to study it for themselves.

We own to a little dread lest, while trying to improve upon Luke Howard's nomenclature, confusion instead of improvement may result, and we venture to suggest that while it is most desirable to thoroughly *discuss* the subject, it is not expedient to *adopt* any new nomenclature until it has been stamped with the approval of an International Conference. Neither Lamarck nor Howard was superhuman, and it would therefore have been extremely remarkable had either of them devised a perfect system.

Poëy himself does not recommend the same nomenclature as he did in 1869, and we see that the Rev. W. Clement Ley, in a long and able article in *Nature* for Jan. 1st, 1880, recommends another, which is in fact a compromise between the nomenclatures of Howard and of Poëy ; and some such combination is, we suspect, very likely to be finally adopted.

We are not so much enchanted with the plates as Prof. Poëy appears to be ; they seem to us too hard in all their outlines, and in that respect far inferior to those which Prof. Poëy truly describes as "les belles gravures des cinq Planches de Schübler."* But that is quite a minor point in a work which has many excellencies. We know of no other which gives anything approaching to a history of cloud nomenclature ; while for its details of cloud structure, and for the completeness of its bibliographical references, it is unequalled.

REMARKS ON SOME POINTS IN PROF. POËY'S "COMMENT ON OBSERVER LES NUAGES."

To the Editor of the Meteorological Magazine.

SIR,—Your readers may make acquaintance with the third edition of Prof. Poëy's work on the clouds ; in this case, the remarks I now offer will, I hope, assist to a clearer understanding of some of the questions raised in that work.

Prof. Poëy understands the stratus of Howard, and points out the mistakes into which meteorologists have fallen, through not keeping in sight Howard's definition. His objections to this one of Howard's modifications are based on the difference of a cloud and a fog, which he endeavours to define. Prof. Huxley is much more happy in his definition—"A fog is a cloud resting on the earth ; a cloud is a fog floating high in the air" (Physiography, fol. 45).

I now turn to cirro-stratus. Here Prof. Poëy is himself somewhat in error, this cloud not being, as he supposes, always higher than cirro-cumulus ; such, indeed, is less usually the case. Plates v. and vi., marked "Cirro-stratus, Howard," do not profess to be all representations of this cloud. I consider, as far as can be gathered from the plates and descriptions, since the lithographs are not delicate enough to show "structure," that in plate v., figures 1, 3, and 6 are cirri ; figure 2, a tiny cirro-cumulus ; figure 7, the cirro-stratus of the higher region—the pallio-cirrus of Prof. Poëy ; figures 4 and 5, plate v. and plate vi., all appear to me to be cirrus becoming cirro-stratus. Plate iii., figure 1, is called cirro-stratus (fol. 53) ; it is cirrus. In plate xi., figure 3, a sheet cirro-stratus is represented ; the upper pallium, plate xii., figure 1, is clearly sheet cirro-stratus. In "Instructions in the use of Meteorological Instruments, 1877," cirro-stratus, chiefly that of mid region, is correctly drawn.

Cumulus and cumulo-stratus are considered by Prof. Poëy to be identical. The commencement of the formation of cumulus-stratus may be found in "Instructions in the use of Meteorological Instruments" ; it is only needful to refer to this to understand the difference between the cumulus and the cloud formed by the inosculation with it of the cirro-stratus of mid region.

The central point in Luke Howard's definition of Nimbus is, that

* Schübler, Dr. G. *Grundsätze der Meteorologie.* Neu bearbeitet von Dr. G. A. Jahn. 8vo. Leipzig, 1849.

rain must be falling from the cloud, or system of clouds, at some point or other.

The descriptions of fracto-cumulus leave much to be desired. At page 108, I read, "Fracto-cumulus sont des fragments de Cumulus, etc.," at page 110, paragraph 2, and in plate xiii, I find it as cirro-stratus about to inosculate with cumulus; in the index, fol. ii, I meet with "Seuls, le Cirro-cumulus et le Fracto-cumulus s'étendent en couches."

It is a pleasure to meet with the third edition of a work on the clouds; when it reaches a fourth, the pleasure would be enhanced if the mistakes which the work at present contains had disappeared.

W. DILLWORTH HOWARD.

Tottenham.

COLD PERIODS.

To the Editor of the Meteorological Magazine.

SIR,—The year that we have just done with, among so many strange meteorological phenomena, affords the singular one of two distinct hard winters—one at each end of the year. During 30 years' observation we have only had three winters, until this year, with 28 continuous cold days and a daily average considerably below freezing. They are as follows:—

1855	.....	28 days	.....	Mean temp.	27°
1860-1	.....	"	.....	" "	25°
1870-1	.....	"	.....	" "	27½°
1879 (Jan.)	.....	"	.....	" "	28½°
1879 (Dec.)	.....	"	.....	" "	28°

Moreover, the cold of last January succeeded three weeks' severe frost in December.

We have only twice had a lower minimum than last December, viz., 8°; once in Dec., 1860, when it was 2°, and in Feb., 1855, when it was zero.

Does not the drought we have entered upon and the high barometer—highest since 1873—point to a change for finer seasons? Let us hope so.—Yours truly,

W. LUCAS,

Hitchin, 4th Jan., 1880.

WHICH IS THE BEST THERMOMETER SCALE?

To the Editor of the Meteorological Magazine.

SIR,—No sooner does a frost take place than there arises the old difficulty as to understanding what people mean when they speak of so many degrees, for they will not confine themselves to speaking of the temperature as it stands marked on the thermometer scale, but talk also of so many degrees of frost, thereby putting everything into confusion, mixing up freezing point with zero till one is at a loss to know whether 5° represents 5° below freezing, i.e., 27°, or 5° below zero, i.e., —5°, or 37° of frost, or 5° above zero, i.e., 5°, or 27° of frost. I do not mean to say that meteorologists would make this mistake, for I believe it is agreed by them all to speak only of

temperatures as they stand marked on the thermometer scale, but the outside public make this mistake every day, and will continue to make it till freezing point is assimilated with zero; so surely it would be better if we could unite together and make up our minds once for all to use some scale that would be as easily understood by the outside public as by ourselves.

The difficulty would be what scale we could use if we discarded Fahrenheit. We should have to select from a number of rival ones, each with perhaps something in its favour, and pick out from these the one which was the best and most suitable for both meteorologists and others. Let us, then, take those which are now chiefly in use, and any others that might be suitable, and compare together. We will place them side by side, and then discuss the merits and demerits of each.

1	2	3	4	5	6	7	8	9	10	11
Fahrenheit.	Centigrade.	Réaumer.	Zero Fahrenheit.	Fifty Fahrenheit.	Hundred Fahrenheit.	Fifty Centigrade.	Hundred Centigrade.	Zero Bi-Centigrade.	Hundred Bi-Centigrade.	Pyramid.
°	°	°	°	°	°	°	°	°	°	°
212	100	80	180	230	280	150	200	200	300	250
194	90	72	162	212	262	140	190	180	280	225
176	80	64	144	194	244	130	180	160	260	200
158	70	56	126	176	226	120	170	140	240	175
140	60	48	108	158	208	110	160	120	220	150
122	50	40	90	140	190	100	150	100	200	125
104	40	32	72	122	172	90	140	80	180	100
86	30	24	54	104	154	80	130	60	160	75
68	20	16	36	86	136	70	120	40	140	50
50	10	8	18	68	118	60	110	20	120	25
+ 39·2	4	3·2	7·2	57·2	107·2	54	104	8	108	10+
+ 32	0	0	0	50	100	50	100	0	100	0+
14	—10	—8	—18	32	82	40	90	—20	80	—25
|| 0	—17·8	—14·2	—32	18	68	32·2	82·2	—35·6	64·4	—44·4||
—4	—20	—16	—36	14	64	30	80	—40	60	—50

* Water boils.

+ Water densest.

‡ Water freezes.

|| Fahrenheit's Zero.

In the above list are eleven different scales, which we will now examine. The first on the list, or No. 1, is Fahrenheit, chiefly in use in Great Britain and her colonies, and in the United States; No. 2 is Centigrade, used mostly in France and Germany; while No. 3 is Réaumer, used principally in Russia. The advantage of either of the two latter over the former is that their zero is at freezing point, while Centigrade has the further advantage of an even 100 degrees between boiling and freezing points. On the other hand, Fahrenheit has the advantage of much smaller degrees, and in having the zero point 32° below freezing you escape the difficulty of a quantity of plus and minus signs in adding up the temperature columns, except in exceedingly rare instances. This, in fact, is the one great disadvantage of fixing zero at freezing point, while its advantage consists in

seeing at a glance which are frosts and which are not, also how intense the frost is, and it is easily understood by the outside public, while the other is not, which to my mind more than counterbalances its disadvantage. The fourth scale on the list I have called Zero Fahrenheit. It is simply Fahrenheit shifted 32° , so that zero corresponds with freezing point. This has the advantage (if advantage it be) over Fahrenheit of having zero at freezing point, while it retains Fahrenheit degrees. Nos. 5 and 6 are respectively Fifty Fahrenheit and Hundred Fahrenheit—that is, Fahrenheit degrees, only freezing point at 50 or 100 degrees respectively. The object of doing this is to practically get rid of the minus signs by fixing the zero point much lower than Fahrenheit does, which of course is a great benefit to meteorologists. Of the two, No. 6 is probably the better in having all below 100° as frosts, as having freezing point at 50° would cause almost as much confusion as it does at present at 32° , the only drawback being that all temperatures above freezing point would consist of three figures instead of two, as at present, thereby giving an additional column to add up. Nos. 7 and 8 are respectively Fifty Centigrade and Hundred Centigrade—that is, Centigrade with freezing point at 50° and 100° respectively, instead of at zero. These contain the same advantage and disadvantage that 5 and 6 do, except that in these two we should have the Centigrade degrees instead of Fahrenheit, which some might prefer. No. 9 I have termed Zero Bi-Centigrade—that is, Centigrade with 200 degrees between freezing and boiling points instead of 100 degrees, thereby reducing the degrees to half the size, which I consider a decided improvement. It has zero fixed at freezing point, to which some might object, so I have placed also on the list No. 10, or Hundred Bi-Centigrade, which is identically the same, except that instead of freezing point being placed at zero, it is placed at 100° , so as to get rid of the minus sign. Boiling point of course would be 300° on this scale. The last on the list, or No. 11, I have called Pyramid scale, that being the name given it by Prof. Piazzzi Smyth, who I believe was the first to introduce it. The only drawback to it is, in the use of the plus and minus signs, while it possesses many advantages. It has the smallest degrees of any; its zero is fixed at freezing point, while at some of the chief points it has a remarkably even scale. For instance, zero is freezing point; at $5,000^{\circ}$, according to Prof. Smyth, platinum melts; at $1,000^{\circ}$ iron becomes red hot or visible in the dark; water boils at 250° , and is densest at 10° ; and freezing mixture (salt and snow) is, I believe, -50° . Now, no other scale will give anything like so even a set of figures; you see at a glance what the temperature is, instead of having to think how much it is above freezing or below boiling, while the awkwardness of the plus and minus sign is, I think, more than compensated for by having a scale equally simple for all; therefore, taking all things into consideration, and assuming that one scale is best for all classes, to my mind Pyramid scale is decidedly the best. I know that it would at first

be an immense difficulty to change, especially as all our readings are in Fahrenheit's scale, but if that scale is bad (and I do not think that many will say that it is perfect), and we ever intend using a better, the longer the change is delayed the greater the difficulty. Of course, for some time there would be a dreadful confusion as to which scale was meant, but that would gradually disappear, and if we adopted the Pyramid scale, I think we should all be surprised at the simple easy working of it. I expect I have put my head into a hornet's nest by opening this question, but shall be satisfied if it causes any of your readers to give their views on the subject, many of whom will doubtless have opinions differing from mine, and thus lead to some result. It is a question that requires much consideration before anything could possibly be done, but there is no harm in discussing it. I am afraid I have already trespassed too much on your valuable space, so remain, dear sir, yours very truly,

W. P. SWAINSON.

*Aspen House, Belvedere Road,
Upper Norwood, S.E., Jan. 1st, 1880.*

DRY JANUARY.

To the Editor of the Meteorological Magazine.

SIR,—The rainfall here during January amounted to only 0·42 in., which fell on four days. This is by far the smallest amount I have registered in this month, and is no less than 2·12 in. below the average of January in the ten years 1868-77 in this district. On two out of the four days the rainfall was very trifling, and the only really wet days were the 15th and 16th. As I think such a dry January must be almost unprecedented, perhaps you may care to insert this note in your Magazine.

I am, dear Sir, yours truly,

B. T. GRIFFITH-BOSCAWEN.

Trevalyn Hall, Wrexham, Feb. 5th, 1880.

P.S.—We have had, as a rule, bright, clear weather of late, but with sharp frosts at night—a singular contrast to the thick fogs which have been so prevalent in London and on the southern coasts.

B. T. G.-B.

A TRAVELLING FOG.

To the Editor of the Meteorological Magazine.

SIR,—A curious instance of what I consider was a London fog travelling thirty miles into the country, happened on 28th and 29th Jan. These two days were very cold and foggy, the fog appearing on the trees as thick rime. When this thawed on the 30th, it was found largely mixed with soot, quite blackening the ground. This was the case far from any human dwelling. No one about here ever remembers noticing the same before.—Yours truly,

E. W. HARVEY.

Throcking Rectory, Buntingford, Feb. 7th, 1880.

REGISTER OF TEMPERATURE AT NANCY & STRASBURG.
 (continued)

November and December, 1879, and January, 1880.

DATE.	NANCY (town).		Meteorological Station at Belle Fontaine.	At Enzheim, Rhine Valley, nr. Strasburg.	REMARKS (FOR NANCY).
	Min.	Max.			
Nov. 15...	+22	+33	Min. +14	8 a.m. ...	As the frost really commenced in the East of France on 15th of Nov., the min. on only two days after that date at Belle Fontaine, having been above 32°, I have thought it might be interesting to submit the complete record from that date.
„ 16...	+25	+37	+18	...	
„ 17...	+32	+41	+23	...	
„ 18...	+39	+50	+36	...	
„ 19...	+36	+40	+33	...	
„ 20...	+21	+33	+14	...	
„ 21...	+34	+35	+26	...	
„ 22...	+35	+41	+30	...	
„ 23...	+36	+40	+27	...	
„ 24...	+32	+37	+28	...	
Here follow the observations recorded at page 188 of the <i>Meteorological Magazine</i> for last month, from 25th Nov. to 29th Dec., inclusive.					
Dec. 30...	+37	+39	+38	...	The thaw lasted five days, from the 30th December to the 3rd January, inclusive.
„ 31... 1880.	+36	+38	+33	...	
Jan. 1...	+43	+47	+52	+47	Frost began again in earnest. From the 4th to the 10th inclusive was dull, still weather, temp. hardly changing night or day. The little wind that blew was from the E. The ice which was frozen so hard last month never went away at all. The 11th and 12th bright, clear, cold days. Cold wind from N.E.
„ 2...	+44	+45	+45	+43	
„ 3...	+42	+43	+34	+41	
„ 4...	+32	+37	+26	+34	
„ 5...	+25	+31	+16	+23	
„ 6...	+28	+31	+17	+27	
„ 7...	+28	+28	+24	+27	
„ 8...	+27	+32	+24	+27	
„ 9...	+28	+35	+27	+27	
„ 10...	+25	+34	+19	+29	Snow, 6 inches.
„ 11...	+26	+33	+24	+21	
„ 12...	+23	+31	+18	+17	Cold day. Snow in Alsace.
„ 13...	+17	+28	+6	+14	
„ 14...	+18	+32	+8	+12	Ditto.
„ 15...	+26	+29	+13	+30	
„ 16...	+20	+32	+10	+12	Slight thaw for a few hours. Snow in Alsace.
„ 17...	+29	+37	+26	+28	
„ 18...	+16	+28	+16	+21	Sharp return of cold. [Alsace. Cold, bright. Very cold East wind.
„ 19...	+10	+19	— 1	+4	
„ 20...	+5	+19	— 6	+1	Cold, bright days.
„ 21...	+13	+30	+10	+15	
„ 22...	+15	+28	+8	+20	Snow, 3 inches.
„ 23...	+23	+31	+19	+18	
„ 24...	+6	+30	zero.	+18	Dense fog and wind.
„ 25...	+13	+24	+5	+12	
„ 26...	+3	+26	— 1	+6	Bitter cold days, but clear and fine.
„ 27...	+2	+22	— 5	+5	
„ 28...	— 1	+19	— 5	— 1	Sharp in the morning till 11 a.m., but the sun begins to make itself felt in the day. Fine clear days.
„ 29...	+1	+29	— 3	+1	
„ 30...	+11	+30	+8	+12	
„ 31...	+12	+29	+10	+10	
Feb. 1...	+13	+31	...	+8	
„ 2...	+14	+35	...	+11	

+ means above zero Fahrenheit ; — means below zero Fahrenheit.

The instruments and localities precisely the same as described at page 186 of the *Meteorological Magazine* for January. The max. for the Belle Fontaine are not given, as they do not show any sensible difference from those at Nancy.

The month of January shewed no such low temperatures as were recorded in December, but the average of the last fourteen days will compare for continuous cold with any previous period of similar length. The ice on the canal at the end of January is 40 centimètres = 16 inches thick, and is frozen hard and clear like the American ice.

The most remarkable feature of this cold period is the amount of sunshine and absence of cloud. After scarcely ever seeing the sun all summer, it is scarcely ever now that we are without the benefit of such warmth as he can give while he is above the horizon; day after day he shines from morning to night in a cloudless sky. Except one fall of snow in November, and the great snowstorm which lasted three days from 4th to 6th December, and two slight falls last month, there has nothing whatever fallen in the shape of rain since the end of October.

G. F. PEARSON, *Colonel.*

MISCELLANEOUS FOREIGN NEWS.

THE WEATHER IN SWITZERLAND.

Our Geneva Correspondent writes under date December 12 :—“No cold so severe as that which now prevails has been experienced for many years. The thermometer stood here this morning at 16° below the zero of centigrade (+3°·2 F.). In North Switzerland the temperature is still lower. In Berne it varies from —18° (—0°·4 F.) to —22° (—7°·6 F.), while at Basel it has been 25° below freezing point, centigrade (—13°·0 F.). Although the Rhône is the most rapid of European rivers, ice is beginning to form along the quays and about the bridges of Geneva, and if the frost continues the stream will soon be covered with thick ice from side to side. The lake of Morat is almost practicable for skaters, and on the lake of Bienne several boats have been broken in pieces by ice floes. The Aar is frozen at Aarau, the Sarine is ice-bound from its source at the foot of the Sanfleuron to its junction with the Aar, below Laussen, and the Rumelinbach, a small stream that runs through Basel, dammed up by masses of ice and snow, has overflowed its banks and flooded an entire quarter of the city, converting the cellars and lower stories of many dwellings into veritable store-rooms of ice.”—*The Times*.

WARMTH AT GREAT ELEVATIONS.

The singular phenomenon has been frequently observed in the mountainous parts of Switzerland, Baden, Bavaria, and elsewhere on the Continent in the course of the current winter that it has been generally warmer in the elevated districts, on the hills and mountains, than in the plains and valleys. A Berne paper prints a correspondence from Flerden, in the Grisons, dated the 28th January, in which the writer says :—“For a month past we have had only two days of cloudy weather; otherwise it has been always a cloudless sky, with

the most beautiful prospect. I have been able to write at the open window, as the sun shines from 8 a.m. till 5 p.m. into my room. At 9 a.m. we have had the thermometer standing at 15° Réaumur (66° Fahrenheit), and at 1 o'clock 17° Réaumur, or 70° Fahrenheit. It is only in the night that the mercury sinks a little under freezing point." Similar reports come from the Black Forest. At Triberg, 2,268 ft. above sea level, it is stated that the inhabitants have enjoyed the most beautiful winter known there for a generation past.

FLOODS IN SARDINIA AND SICILY.

Sardinia has been visited by inundations. At Muravera 12 out of 14 columns of a bridge were carried away, another bridge became unsafe, the whole valley of the Sarrabus was flooded, and houses and factories have been under water ; but no loss of life is reported.

Eleven days' continuous rain has caused floods in Sicily. Communication between Messina and Syracuse is suspended, the railway bridge over the Alcantara has fallen in, most of the sulphur mines are inundated, and the Plain of Catania is an immense lake, boats having had to be sent to rescue peasants from the roofs of the houses. The orange and lemon plantations are in danger of being destroyed. Such a rain has been unknown since 1818.—*The Times*, Feb. 10.

LAKES FROZEN SOLID.

The Lake of Zirknitz, in Carniola, is a solid mass of ice, myriads of fish being killed ; and several large lakes in Upper Austria are also frozen solid, a phenomenon which last occurred 25 years ago. On the Lake of Constance, near Bregenz, a newspaper has been printed to commemorate the "Ice Jubilee," the lake being frozen over about once in 50 years, the last date being 1829-30.

The Maine is again frozen over at Mayence, thus once more this winter interrupting the traffic with the opposite shore. The ice was not thick enough on the 5th inst. to be crossed without danger.—*The Times*, Feb. 10.

THE WEATHER IN JANUARY.

On the 30th December a deep depression was advancing towards the west coast of Scotland from the Atlantic, causing very steep gradients over England and Ireland ; by the next day this depression had travelled in a N.E. direction till its centre was over northern Sweden, while a second depression appeared off the west coast of Scotland ; the mercury falling in the east and rising in the west later in the day. The general conditions at the beginning of the new year were hence very unsettled.

The cyclone (the latter of the two above-mentioned) had its centre over the Hebrides on Jan. 1st, but by the following day had moved away to the Norwegian coast, and continued its journey in a N.E. direction during the day, the bar. rising somewhat generally over these Islands. The depression having passed off, and no other following it, the pressure increased rapidly over these Islands, the weather becoming fine and dry.

The weather during the next seven days (6th–13th) was very dry generally, but extremely dull and gloomy over England, in a less degree also in Ireland and, during some of the time, in Scotland. Temperature, although lower than at the beginning of the month, was slightly above the mean in Ireland and the greater part of Scotland, but nearly everywhere else was as much as 4° or 5° below mean. Wind was light, except in the south-west and west, and very little rain was measured. An anticyclone had its centre, with little alteration from day to day, over England, the North Sea, and the N.E. and centre of France during the whole period, whilst a slight depression was shewn in Scandinavia till the 9th, when a brisk rise was reported. This new area of high pressure became amalgamated with the other area on the 9th, so that by the 11th the bar. was “rising over the whole of Western Europe, the anticyclone still shown in the same position, with comparatively low readings over Spain and N. Sweden”; weather generally being very fine.

The weather from this date (12th) till the 27th was generally anticyclonic. During the seven days (13th–20th) it was fine generally in Ireland and Scotland; dull, gloomy, or misty over England until the 16th, when there was a material improvement. Temperature continued below the average for time of year in *all* districts; over the greater part of England the deficit ranged from 5° to 7° , but at Marlborough was as much as $9^{\circ}7$, at Strathfield Turgiss $8^{\circ}8$, at Cirencester $8^{\circ}6$, while at Mullaghmore it was only $1^{\circ}8$, at Donaghadee $2^{\circ}1$, and at Aberdeen $2^{\circ}5$. Rainfall was also much less than the average nearly everywhere. The total fall was least at Spurn Head, 0.010 in., at Yarmouth 0.020 in., and at Lowestoft 0.035 in.

Similar conditions prevailed during the whole of the week following, and indeed till nearly the end of the month. Temperature was 3° below average in E. Scotland, 6° below in N.E. England and W. Scotland, and as much as 7° to 10° in all other districts. Over the inland parts of England the lowest of the min. readings at some places was on the 20th, but another very low reading was observed in some places on the 26th, and again on the 28th and 29th. On the 20th the bar. fell briskly over Scandinavia, and continued to do so the whole of the next day, but it rose again on the 22nd. A fresh fall was, however, reported on the 23rd, continuing till the 25th. On this day a fall of the bar. was reported from all W. Europe, with the exception of Sweden and Denmark, where an increase of pressure was in progress. These conditions were again reversed on the 26th, readings becoming high and uniform over England, France, and N. Germany, but moderate gradients existed in the north. On the 27th it was predicted that a large depression was approaching our N.W. coasts from the Atlantic: this proved to be correct, for on the evening of the 28th the depression was reported as over our N.W. coasts, travelling away N.E., and reaching the N.W. of Norway by the morning of the 29th, its dimensions being found very large. The continual passage of depressions in a N.E. direction along our western coasts caused the area of high pressure to draw in on its W. side from day to day, so that the mild weather which had been reported from Scotland since the 26th gradually spread over England and the western side of France. On the 31st, however, the bar. rose in all parts of the British Isles, most in the N.W., and the depressions in the W. and N. all disappeared; the area of high pressure over Germany and France thus again extended westwards, over the S.E. counties of England. As a consequence, whilst S.W. winds still prevailed over the greater part of this kingdom accompanied by mild weather, calms, fog and frost returned to the south-eastern and inland parts of England, the temp. in London being 18° lower than in the extreme S.W., and about 15° lower than in Scotland.

Lowestoft.

H. E. M.

N.B.—I take the opportunity afforded by the beginning of a new series of articles to remark that these Summaries are drawn up entirely from the Meteorological Office “Weekly Weather Report” and “Daily Weather Report.”

SUPPLEMENTARY TABLE OF RAINFALL IN JAN., 1880.

[For the Counties, Latitudes, and Longitudes of most of these Stations,
see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger	·60	XI.	Corwen, Rhug	·59
„	Margate, Acol	·16	„	Port Madoc	1·55
„	Littlehampton	·47	„	Douglas	·84
„	St. Leonards	·42	XII.	Carsphairn ...	2·71
„	Hailsham	·49	„	Melrose, Abbey Gate...	1·00
„	I. of W., St. Lawrence.	·65	XIV.	Glasgow, Queen's Park.	...
„	Strathfield Turgiss	·57	XV.	Islay, Gruinart School..	2·64
III.	Great Missenden	·69	XVI.	Cupar, Kembach	1·22
„	Winslow, Addington ...	·45	„	Aberfeldy H.R.S.	1·79
„	Oxford, Magdalen Col...	·42	XVII.	Tomintoul	...
„	Northampton	·33	„	Keith H.R.S.	1·74
„	Cambridge, Merton Vil.	·22	„	Forres H.R.S.	·87
IV.	Harlow, Sheering	·23	XVIII.	Strome Ferry H.R.S....	5·76
„	Diss	·14	„	Auchnasheen H.R.S. ...	...
„	Swaffham	·12	„	Lochbroom	3·72
„	Hindringham	·20	„	Tain, Springfield	1·61
V.	Salisbury, Alderbury ...	·49	„	Loch Shiel, Glenfinnan.	12·00
„	Calne, Compton Bassett	·61	„	Dalwhinnie H.R.S.....	...
„	Beaminster Vicarage ...	·59	XIX.	Lairg H.R.S.	1·66
„	Dartmoor, Princetown..	2·55	„	Altnabreac H.R.S.	1·06
„	Langtree Wick	·45	„	Watten H.R.S.	1·53
„	Lynmouth, Glenthorne.	1·94	XX.	Fermoy, Glenville	1·98
„	St. Austell, Cosgarne...	...	„	Tralee, Castlemorris ...	·87
„	Taunton	·31	„	Cahir, Tubrid	1·12
VI.	Bristol, Ashleydown ...	·69	„	Tipperary, Henry St....	·90
„	Ross	·66	„	Newcastle West	·76
„	Wem, Sansaw Hall	·89	„	Kilrush	1·14
„	Cheadle, The Heath Ho.	·44	„	Corofin	1·10
„	Bickenhill Vicarage ...	·55	XXI.	Kilkenny, Butler House	·90
VII.	Melton Mowbray	·43	„	Carlow, Browne's Hill..	·90
„	Horncastle, Bucknall ...	·24	„	Kilsallaghan	·75
VIII.	Walton-on-the-Hill	·65	„	Navan, Balrath	...
„	Broughton-in-Furness ..	1·59	„	Athlone, Twyford	1·00
IX.	Wakefield, Stanley Vic.	·18	„	Mullingar, Belvedere ...	·83
„	Ripon, Mickley	·35	XXII.	Ballinasloe	·88
„	Scarborough	·34	„	Clifden, Kylemore	8·88
X.	Gainford	·41	„	Crossmolina, Enniscoe..	...
„	Haltwhistle, Unthank..	·96	„	Carrick-on-Shannon ...	1·65
„	Shap, Copy Hill	2·17	XXIII.	Dowra	1·78
XI.	Llanfrechfa Grange	·80	„	Rockcorry	1·08
„	Llandovery	·82	„	Warrenpoint	1·34
„	Solva	·74	„	Newtownards	·85
„	Castle Malgwyn	·68	„	Carnlough	...
„	Rhayader, Nantgwillt..	2·04	„	Bushmills	2·05
„	Carno, Tybrite ...	1·48	„	Buncrana	2·31

JANUARY, 1880.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.				Days on which ·01 or more fell.	TEMPERATURE.				No. of Nights below 32°	
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.								
				Dpth	Date.		Max.		Min.			
							Deg.	Date.	Deg.	Date.	In shade.	On grass.
		inches	inches.	in.								
I.	Camden Square.....	·31	— 1·64	·19	16	5	55·4	1	19·2	27	21	26
II.	Maidstone (Hunton Court)...	...	...	...	...	...	...	...	...	...	...	...
III.	Selborne (The Wakes).....	·84	— 2·43	·38	16	3	50·0	1,2	15·0	19	21	27
III.	Hitchen.....	·26	— 1·88	·12	16	7	52·0	1	17·0	27	29	...
IV.	Banbury.....	·50	— 1·59	·26	16	10	47·8	2	15·0	20*	27	...
IV.	Bury St. Edmunds (Culford)...	·16	— 1·71	·04	22	8	55·0	1	14·0	27	26	29
V.	Norwich (Cossey).....	·11	— 1·49	·05	22	4	55·8	1	17·0	27	22	24
V.	Bridport.....	·45	— 2·74	·23	12	5	...	...	...	...	...	...
V.	Barnstaple.....	·71	— 2·81	·25	16	6	54·0	1,2	20·0	21†	...	...
VI.	Bodmin.....	·95	— 4·24	·35	16	8	49·0	1	24·0	27	11	17
VI.	Cirencester.....	·68	— 2·32	·32	13	4	...	...	...	...	...	...
VI.	Shifnal (Haughton Hall) ...	·55	— 1·35	·27	16	7	53·0	1	12·0	20	22	...
VI.	Tenbury (Orleton).....	·48	— 2·05	·18	16	6	59·0	3	14·8	20	21	23
VII.	Leicester (Town Museum) ...	·35	...	·21	16	6	54·8	1	17·0	29	19	27
VII.	Boston.....	·22	— 1·49	·05	4,15	8	55·0	1	18·0	29	20	...
VII.	Grimsby (Killingholme).....	·29	...	·18	1	5	54·5	1	21·0	29	15	...
VII.	Mansfield.....	·39	...	·18	15	6	53·4	1	17·7	20	22	20
VIII.	Manchester (Ardwick).....	...	...	...	...	...	...	...	...	...	...	...
IX.	York.....	·42	— 1·16	·15	16	8	49·0	31	20·0	20	22	23
X.	Skipton (Arncliffe).....	·61	— 5·03	·20	1	9	...	...	...	...	...	...
X.	North Shields.....	·38	— 1·73	·24	16	4	57·2	1	22·2	20	19	19
X.	Borrowdale (Seathwaite).....	4·77	— 11·59	2·06	30	12	...	...	...	...	...	...
XI.	Cardiff.....	·87	...	·42	13	11	54·8	1	18·0	21	18	...
XI.	Haverfordwest.....	1·02	— 4·03	·42	16	8	53·0	1	15·1	21	16	19
XI.	Aberdovey.....	1·31	...	·48	15	5	...	...	...	...	...	...
XI.	Llandudno.....	·70	— 1·84	·29	15	4	56·0	31	24·2	21	15	...
XII.	Cargen.....	·82	— 3·87	·31	1	8	51·2	2	18·0	21	15	...
XII.	Hawick (Silverbut Hall)...	1·30	...	·50	30	11	...	...	...	...	...	...
XIV.	Douglas Castle (Newmains)...	1·14	...	·35	1	8	...	...	...	...	...	...
XVI.	Loch Long (Ardaroch).....	...	...	...	...	...	...	...	...	...	...	...
XVI.	Kilmory.....	3·41	...	1·27	29	14	...	...	...	...	...	...
XVI.	Mull (Quinish).....	5·09	...	1·65	29	17	...	...	...	...	...	...
XVI.	Loch Leven.....	...	...	...	...	...	...	...	...	...	...	...
XVII.	Arbroath.....	·96	— 1·56	·37	29	5	53·0	1	23·0	21	...	15
XVII.	Braemar.....	1·06	— 2·07	·23	2	9	53·0	1	11·0	17	19	30
XVIII.	Aberdeen (Rose Street).....	...	...	...	...	...	...	...	...	...	...	...
XVIII.	Portree.....	9·26	— 3·83	1·78	29	19	...	...	...	...	...	...
XVIII.	Inverness (Culloden).....	1·49	— ·79	·76	24	6	53·0	1	23·0	19	8	25
XIX.	Dunrobin.....	2·07	— ·58	·86	15	12	55·0	1	26·0	12	11	...
XIX.	Sandwick.....	2·40	— ·89	·30	1	19	53·1	1	31·8	16	3	11
XX.	Cork.....	...	...	...	...	...	...	...	...	...	...	...
XX.	Darrynane Abbey.....	...	...	...	...	...	...	...	...	...	...	...
XX.	Waterford.....	·67	— 4·19	·29	30	11	55·5	1	29·0	14+	10	...
XX.	Killaloe.....	·86	— 4·00	·34	29	9	53·0	30	16·0	23	13	...
XXI.	Portarlington.....	·92	— 3·09	·31	26	7	55·0	1	21·0	6	20	...
XXI.	Monkstown.....	·45	— 2·94	·09	15	8	...	...	...	...	...	...
XXII.	Galway.....	...	...	...	...	...	...	...	...	...	...	...
XXIII.	Waringstown.....	1·24	...	·33	15	11	54·0	1	13·0	20	13	18
XXIII.	Londonderry.....	...	...	...	...	...	...	...	...	...	...	...
XXIII.	Edenfel (Omagh).....	1·90	...	·79	15	11	54·0	1	14·0	21	13	...

* And 28. † And 22, 23, 26, 28. ‡ And 18, 20, 23, 26.

+ Shows that the fall was above the average; — that it was below it.

METEOROLOGICAL NOTES ON JANUARY.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

SELBORNE.—Prevailing wind north, varying a little to E. and W. The driest January I ever recorded.

HITCHEN.—The coldest January for 30 years, except Jan., 1869. Very little sunshine until the last few days. Only six drier months in the past 30 years.

BANBURY.—Mean temp. of month $32^{\circ}9$. On the 27th, 28th and 29th the appearance of trees and hedges was remarkably fine; the rime being the most beautiful that has come under my notice. On the morning of the latter day the ice spiculæ were fully an inch in length, and were arranged in radiating tufts. High wind on 1st and 2nd.

CULFORD.—An exceedingly cold month; the mean temp. being only $32^{\circ}3$, which is much below the average. Only two days without frost on the grass, viz., 1st and 2nd. North and easterly winds prevailed on 13 days. The month may almost be said to have been rainless, as the small amount registered ($\cdot 16$ in.) was mostly melted S.

COSSEY.—The driest January recorded. Observations commenced in 1858.

BODMIN.—Mean temp. $40^{\circ}0$. Mean barometric pressure $30\cdot33$ in.; the highest ever registered here. On four days the mercury reached $30\cdot60$ in. As regards the rainfall of the past four months (Oct., Nov., Dec. and Jan.), I doubt whether so small a quantity has fallen in the corresponding period during ages.

CIRENCESTER.—A cold, dry month, with remarkable absence of stormy winds.

SHIFNAL.—The mild weather with which the old year closed continued till the 8th, when frost returned, equalling in severity that of December. Remarkably gloomy sky throughout, with frequent fog, which on the 28th caused a heavy rime. Wind chiefly from S.E.

ORLETON.—A very cloudy, gloomy month, with a great prevalence of fog. There were only a few slight frosts till the 13th, when about 2 in. of S fell, and frost set in again. From the 18th till the 30th the frost was very severe, and the Teme and Severn were frozen over. From the 27th to the 30th there was a thick fog, with fine rime. Mean temp. $5^{\circ}5$ below the average, and the rainfall is the smallest amount recorded in January during the last fifty years, with the exception of 1855, when $\cdot 47$ in. fell. Bar. very high throughout.

BOSTON.—Mean temp. of month $32^{\circ}9$; $4^{\circ}5$ below the average of the previous 16 years. A large proportion of the R recorded this month is due to the condensed moisture in the atmosphere; no visible R having fallen on three occasions when water was found in the rain-gauge. The total rainfall since the end of Aug. has been $6\cdot18$ in., of which $3\cdot45$ in. fell in Sept.; the average of these five months being $10\cdot04$ in. In consequence of this small fall, water is becoming very scarce in the Fens, where the chief supply for household purposes is from the rain-water collected from roofs.

KILLINGHOLME.—The driest month for 15 years, and probably more. A fine winter month, and favourable for farmers, but thrushes and smaller birds have perished in great numbers. Bar. very high and steady.

ARNCLIFFE.—The smallest fall I have ever registered in January.

WALES.

HAVERFORDWEST.—January was characterized by a remarkable absence of R, high bar., absence of wind, and low temperature. Frost intense from the 17th to 27th; so severe a frost has not been experienced in this country since Jan., 1867; even the river Cleddy (at its eastern and western junction, where it is tidal, and fully a mile in breadth) was so completely frozen over, that it took two hours, on the morning of the 21st, to cut a passage through the ice for the ferry-boat.

LLANDUDNO.—Month bright, fine, and dry. Rainfall barely one-fourth of the average. Fifteen frosty days, and the mean temp. 6° below the average, but the cold was not unpleasantly felt, owing to the great amount of sunshine, and comparative calmness of the air.

SCOTLAND.

CARGEN.—Hard frost prevailed from the 12th to the 26th of the month. Remarkable want of sunshine, and exceptionally high barometer. L on 1st, 2nd, and 3rd.

HAWICK.—Hurricane on the 1st; then very mild and spring-like weather up to the 14th, when there was a keen frost, and 3 in. of S. fell. Very little wind during the month, but much damage has been done by the severe frosts.

QUINISE.—A fine month, except from 26th to 30th. Some slight frosts, but no S. So far, a very favourable winter for farm work and stock.

PORTREE.—Generally an open month, squally, and cold, but no severe frosts. T and L on 2nd.

CULLODEN.—Frost severe on many days and nights during the month, particularly from 5th to 26th. Vegetation retarded, but no apparent injury. Little S.

SANDWICK.—The weather was remarkably mild, owing to the prevalence of westerly wind, of which we had only one day in January, 1879, so that we had no ice on our lochs, while there was ice for skating even in the south of England. The snowdrop and the crocus are beginning to peep out in the garden; wind 50 miles an hour from 4 to 5 a.m. on 2nd, and from 10 p.m. on 2nd to 2 a.m. on 3rd.

IRELAND.

KILLALOE.—We have been favoured with the most beautiful weather ever known for January in this part of the country; some hard frosts occurred up to 27th, with bright clear days and slight winds from N. and N.E.; considerable rise in temp. towards the close of the month, and soft genial S.W. breezes.

WARINGSTOWN.—The driest January on my record (register commenced 1862), in 1876, 1.25 in. fell, but no other January comes near it.

TROPICAL RAINFALL, 1879.

CEYLON.—The rainfall return for Colombo has been closed to the end of last year. During 1879 there had fallen at that station 84.32 in., as compared with 139.70 in. in 1878, 105.84 in. in 1877, and 86.51 in. in 1876. The lowest return recorded was in 1875, when only 57.03 in. were registered. The highest return of rainfall during the month of October last came from the Kabragala estate, in the Nawalapitya district, where no less than 22.05 in. fell.

BRITISH GUIANA.—Christmas-tide had brought with it fine weather, but there had been several heavy falls of rain. The rainfall of last year was above the average, 110 in. having been registered. In Georgetown itself there had been only 90 in., but in Essequibo it had reached 120 in. The year's rainfall had been the heaviest known, with some trifling exception, since 1849, when no less than 132 in. fell. The heavy rainfall had severely tested the drainage power of the estates; but, with few exceptions, they had borne the test well, and only one or two districts had been flooded.—*The Colonies and India.*